

Sepsis Bundle Compliance in the Emergency Department

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By

Christine E. Thiel, MSN, ACNP-BC, ANP-BC

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DNP Project Committee:

Dr. Joyce Zurmehly, PhD, DNP, RN, NEA-BC, Advisor

Dr. Carolyn McClerking, DNP, MS, ACNP-BC

Dr. Carolyn Schubert, DNP, CNE, RN-BC

### Abstract

Despite knowledge that sepsis bundle (SB) use is associated with decreased mortality, bundle compliance is often low among Emergency Department (ED) providers. The purpose of this quality improvement project is to assess the perceived barriers, beliefs, and preferences influencing sepsis bundle use among providers in an urban emergency department. The objective is to evaluate the understanding of the SB protocol by ED providers, and their perceptions of the benefits or potential harm for the patient when compliance with this protocol is low. A literature review was completed to analyze current best practice and recommendations. Project design included presenting open-ended discussion questions to a single focus group of ED providers to assess barriers to and knowledge of the SB and the surviving sepsis guidelines. Themes were analyzed following transcription of the discussion.

While most providers were aware of the SB, the majority felt the SB was too long and had too many erroneous orders pre-selected for the provider. Providers felt that choosing the orders separately was then easier than using the SB. Additionally, the group agreed that the SB was often not used because sepsis was just difficult to identify most of the time unless the patient was blatantly ill. Evidence supports the use of bundles to improve consistent application of evidence-based practice in the septic patient. This quality improvement project supports the common barriers throughout the literature including difficult identification of sepsis along with lack of awareness and very little education about the SB and guidelines. Compliance has the potential to be increased through adjustments in the SB orders, and providing education on the importance of using and reviewing the components of the SB.

*Keywords:* sepsis bundle, compliance, sepsis compliance, emergency department, surviving sepsis, sepsis guidelines, quality improvement

## Sepsis Bundle Compliance in the Emergency Department

### Section 1: Nature of the Problem

#### Introduction to the Problem

Sepsis is an ongoing problem in emergency medicine that is responsible for over 500,000 emergency department (ED) visits annually and has a variable mortality rate of 25-50% related to severe sepsis, and septic shock (Burney et al., 2012; Nelson, Smith, Jared, & Younger, 2011; Narayanan, Gross, Pintens, Fee, & MacDougall, 2016). Sepsis is also the 10<sup>th</sup> leading cause of death in the United States (US) and the incidence continues to rise (McRee, Thanavaro, Moore, Goldsmith, & Pasvogel, 2014). With the increasing prevalence and cost, aggressive sepsis interventions are critical (Siontis et al., 2015). Quality improvement methods to improve early identification and treatment of sepsis, such as sepsis order sets or bundles, have been developed to help reduce sepsis-related mortality (Rhodes et al., 2015). Despite these approaches, physician knowledge of bundles and low guideline compliance persists in multiple ED settings (Bruce, Maiden, Fedullo, & Kim, 2015; Tufan et al., 2015). Incidentally, the beneficial impact of sepsis bundles (SB) is highly correlated with compliance of using the bundles (Jozwiak, Monnet, & Teboul, 2016).

The clinical issue of interest is how compliance with SBs can be improved in the ED so the Surviving Sepsis Campaign (SSC) guidelines, which recommend protocol-driven management of septic ED patients, can be met (Bruce et al., 2015). The SSC bundles are considered the gold-standard initial therapy for sepsis (Head & Coopersmith, 2016). The SSC bundle is comprised of four elements to be completed within three hours of ED admission including measuring serum lactate, obtaining blood cultures prior to antibiotic (ATB) administration, administering broad-spectrum ATBs, and infusing 30 ml/kg of intravenous (IV)

crystalloid fluid in patients with hypotension or a lactate level of 4 mmol/L or greater (Bruce et al., 2015). A meta-analysis by Gu, Wang, Bakker, Tang, and Liu (2014) supports that goal-directed therapy (GDT) significantly reduces mortality in septic patients, which can be better achieved through improved SB compliance.

Annually, sepsis can cost more than \$16 billion dollars, affects more than 750,000 patients, and causes at least 215,000 deaths (Bastani et al., 2012). Sepsis mortality cost the US \$14.6 billion in 2008 alone and was identified as the most expensive condition treated in hospitals as of 2011 (Alsolamy et al., 2014; “Process improvements”, 2015). The number of cases is set to continue growing at a rate of about 2% per year (Bastani et al., 2012).

Sepsis is a systemic host response to a bacterial, viral, or fungal infection that can lead to severe sepsis and septic shock (Dellinger et al., 2013, p. 583; McRee et al., 2014). Severe sepsis is characterized by acute organ dysfunction secondary to documented or suspected infection. Septic shock is severe sepsis with the addition of refractory hypotension causing global tissue hypoxia, which is an indicator of serious illness and often precedes multi-organ failure and death (Dellinger et al., 2013; Rivers et al., 2001). Severe sepsis and septic shock are time-critical emergencies affecting millions globally.

Carlbon and Rubenfeld (2007) compare sepsis to other time-sensitive critical care conditions such as trauma, myocardial infarction (MI) and cerebral infarction (CVA). These disorders have exhibited improved outcomes with early identification and treatment in the ED. For comparison, there is a 19-21% mortality rate for severe sepsis and septic shock, which surpasses the 8% mortality rate for MI patients (Wallgren et al., 2016; Head & Coopersmith, 2016). In the US, sepsis contributes to 1 in every 2-3 deaths, and most patients have sepsis at the time of hospital admission (Keep et al., 2015). With this high mortality rate, timely recognition

and early treatment are vital in sepsis management (Siddiqui & Razzak, 2010).

The ED is a primary point of care for patients who are septic and early identification is critical to improving patient outcomes (McRee et al., 2014). Adversely, the presentation of sepsis while common is often vague and identification can be difficult for providers. This can lead to delayed care and a worsened prognosis (Wallgren et al., 2016).

“Bundles ensure that strongly evidence-based clinical practice is consistently applied in a sustained pattern to all patients on all occasions” (Masterson, 2009, p. 1150). The priority in bundle implementation is to change clinical practice because the majority of the time, key clinical interventions are not regularly applied to all patients. Bundles allow providers to reliably deliver the best care possible, allowing for improved care in a structured way. The Institute for Healthcare Improvement (IHI) defines bundles as “a group of interventions related to a disease process that, when executed together, result in better outcomes than when implemented individually” (Jozwiak et al., 2016, p. 2). Bundles are made up of a small number of processes that have been shown to work with the highest quality of evidence so that implementing them all together will improve patient outcomes (Masterson, 2009). The principal goals of the SB approach for diagnosis and management include a reduction in mortality, improve patient outcomes, ensure more consistent and timely use of evidence-based care, and reduce practice variability (Cabana et al., 1999; Jozwiak et al., 2016).

The SSC was developed to reduce mortality from severe sepsis and septic shock with goal-directed activities including the development of best practice recommendations and evidence-based guidelines (Dellinger et al., 2013; Rhodes et al., 2015). Implementing best practice is difficult independent of extraneous variables, so it is important for the organization to direct efforts to sustain an environment of change (Joshi, Ransom, Nash, & Ransom, 2014).

SB benefits are directly related to compliance, so clinical practice has to change for this to be effective. This requires clinician willingness to adopt new ways of working and managing orders, and also demands that organizations support these changes internally (Masterson, 2009).

Financially, sepsis has ranked as the most expensive condition associated with hospitalization within the last ten years with incidence rates continuing to rise (Gohil et al., 2016). Angelelli (2016) reports the financial impact of sepsis is about \$24 billion annually, and that estimate only includes crucial ED and Intensive Care Unit (ICU) hospital care. The cost of sepsis totals tens of billions annually and has a 30-50% mortality rate (Shorr, Micek, Jackson, & Kollef, 2007). The use of ED-based sepsis protocols can improve outcomes, with a potential financial benefit from more rapid critical illness recovery and the decreased need for ICU care (Shorr et al., 2007).

Other considerations related to sepsis care are the policy issues related to the Centers for Medicare and Medicaid Services (CMS) coding that have led to more documented incidences of sepsis based on diagnosis codes. Direct financial impact of sepsis treatment should be considered when creating an environment of change (Angelelli, 2016). Reimbursement will be affected by proper diagnosis and treatment of sepsis, which can now be recognized earlier through use of the electronic medical record (EMR) capabilities. The providers in the ED can view vitals signs and patient complaints while the patient is still in the triage waiting area. At times, the provider or ED nurse can clinically distinguish those patients who may be at higher risk of developing sepsis or already being septic. Thus, the patient can be placed in an ED room for an expedited provider evaluation. The EMR will also allow for more accurate tracking of sepsis trends, which is important in the context of government mandated sepsis protocols and the public reporting of sepsis outcomes (Gohil et al., 2016). More accurate data collection will also allow for more

informed decisions by insurance companies to make payments and the community when deciding where to receive care. SBs will allow more timely management and improved patient outcomes, making the organization a more desirable location from which to receive care.

### **Purpose of the Project**

Currently, the nurse manager within this community-based hospital, which is part of a larger Midwestern academic medical center, has noted poor provider compliance with the sepsis bundle in the ED (K.Groves, personal communication, September 2014). The hospital has 190 beds, serving 50,000 patients annually and is located in an urban community setting. The ED of interest to this project has 29 beds, serving over 40,000 annually and maintains over 20 providers on staff. The institution has policies in place for using evidence-based protocols; however, the documented low compliance with the sepsis bundle indicates barriers exist.

The purpose of this project is to assess the perceived barriers, beliefs, and preferences influencing SB use among providers in an urban emergency department. The primary aim of this project is to evaluate the implementation of an evidence-based SB protocol in the ED. The objective is to evaluate the understanding of the SB protocol by ED providers, and their perceptions of the benefits or potential harm for the patient when compliance with this protocol is low. In summary, this clinical inquiry will seek to understand why compliance with the SB protocol in the ED is low, and to make recommendations for improvements.

## **Section 2: Review of the Literature**

### **Clinical Practice Problem Statement**

The population of interest is practice providers working in the ED at this institution. The clinical problem is: How do practice providers working in the ED perceive the importance of using an evidence-based SB, and what identifiable barriers and facilitators impede its use? Early

therapy is the cornerstone for optimizing outcomes in septic patients, so SBs have a viable role in improving treatment of this major public health problem (Nguyen et al., 2014; Wang, Xiong, Schorr, & Dellinger, 2013). Adherence to SSC guidelines remains poor, especially in non-intensive care providers (Damiani et al., 2015). Using the SSC SB can lead to sustained quality improvement in sepsis care and is associated with decreased mortality (Dellinger et al., 2013).

### **Summary of Evidence from the Literature**

**Literature Search.** The literature search process involved primarily using the search engine of PubMed using terms including “sepsis,” “bundles,” “compliance,” and “emergency department.” MeSH terms included “sepsis,” “patient care bundle,” “hospital emergency service,” and “guideline adherence.” When searching only using the term “sepsis,” 39,709 articles were found. With searching “sepsis bundles,” 235 articles were found with six being used for this project on initial review. Two of those articles were unable to be found and several were not relevant because there were related to other disease processes other than sepsis, or were not relevant to the ED. Other filters used in searching were that articles should be no more than ten years old, should be in English, and should be related to human species. When using MeSH terms of “sepsis,” “patient care bundle,” and “guideline adherence” five results were found, but were not related to this project. When searching with “patient care bundle” and guideline adherence” 14 articles were found, but none were relevant to the project. The majority of the remaining articles were found by searching for specific titles or authors after reviewing references from articles found during the initial searches.

Selection criteria primarily included articles relevant to the hospital setting and more so the ED. Sepsis was the primary keyword but other disease processes associated with bundle use were also considered, such as pneumonia. When searching for intervention related literature, the



surveys included in the articles were reviewed to ensure their relevance to the project and population. Outcomes were also analyzed to confirm the article would provide strong evidence to support any needed practice change.

**Literature Synthesis.** Head and Coopersmith (2016) report that the gold standard for sepsis treatment is the use of the SSC bundles. These interventions have shown to significantly decrease mortality in a population of about 30,000 patients, and are part of the first quality metric for sepsis from the National Quality Forum and the Centers for Medicare and Medicaid Services (CMS). The meta-analysis of randomized controlled trials by Gu et al. (2014) supports that goal-directed therapy, as in sepsis bundles, is associated with a 17% reduction in overall mortality in septic patients when initiated early. One of the earliest opportunities for sepsis identification is upon presentation to the ED, so this is certainly relevant to the population and environment of interest. Outcomes are highly related to the initial appropriateness of therapy (Rusconi et al., 2015) (see Appendix C for literature synthesis table).

The SSC guidelines by Dellinger et al. (2013) support the use of the SSC SB because the early implementation of evidence-based therapies can improve outcomes and decrease sepsis-related mortality. Unfortunately, early recognition is often difficult due to presentation variation or factors such as ED overcrowding (Burney et al., 2012). Focusing on improvement in care through improved compliance with sepsis quality indicators is a goal of the SSC to improve patient outcomes. This recommendation is ungraded per the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system used within the SSC, but still has foundational support for improving patient outcomes based on other evidence-based recommendations for care of the septic patient (Dellinger et al., 2013).

In hopes of improving patient outcomes, the SSC supports education and performance

feedback as methods of improving compliance with SBs and changing clinician behavior (Dellinger et al., 2013). The SSC promotes the use of consistent education and feedback during educational sessions to improve compliance and to help evaluate process changes. These methods can also help identify additional areas for improvement. The SSC guidelines are found within the National Guidelines Clearinghouse and are summarized there for provider reference. The Appraisal of Guidelines for Research and Evaluation II Instrument places the SSC guidelines as high quality. Also, the SSC guidelines have internally graded their own recommendations, which are visible upon review of the document.

Masterton (2009) defines bundles as ways to consistently apply the evidence-based clinical practice to all patients, which allows for more reliable care delivery among providers. He also endorses that clinical practice change requires the willingness of clinicians to adopt new ways of working and accept bundle use. Bundle use can also assist in improving core measure compliance and reducing mortality (Krive, Shoolin, & Zink, 2015). Jozwiak, Monnet, and Teboul (2016) additionally endorse the use of sepsis bundles to reduce mortality, ensure consistent use of evidence-based care, and reduce variability in clinical practice. Compliance with the bundles is directly related to the beneficial effects as evidenced by lower mortality in sites with high rates of bundle compliance versus those with low compliance (Jozwiak et al., 2016; Rhodes et al., 2015). Therefore, there is a relationship between low bundle compliance and increased mortality. The use of a SB was low in multiple studies, which supports that there is difficulty in translating evidence to the clinical arena.

Tufan et al. (2015) report that physician knowledge of the SB is not optimal, despite the fact that they are the ones primarily providing care to the septic patients. Knowledge of the SSC guidelines and sepsis requires more attention to improve outcomes. Barriers to using SBs include

knowledge, attitude and behavioral barriers (Wang, Xiong, Schorr, & Dellinger, 2013). Cabana et al. (1999) also support some barriers using and adherence to include lack of awareness, lack of familiarity, lack of agreement on guidelines, lack of outcome expectancy, and the inertia of previous practices. External barriers were also included, such as time limitations or lack of a reminder system. Methods for improving compliance with SBs include discussions at staff meetings, educational offerings, continual surveys on sepsis compliance, and the use of checklist stickers (Bentley, Henderson, Thakore, Donald, & Wang, 2016). These methods were all part of the Plan, Do, Study, Act (PDSA) cycle in a particular ED. There was a significant increase in compliance following these interventions. Through a systematic review and meta-analysis of 50 observational studies, utilization of performance improvement initiatives improves SSC guideline bundle compliance and is associated with decreased mortality (Damiani et al., 2015). Programs included educational activities, which alone were enough to improve compliance with SBs. Activities include programs that raise clinician awareness about the sepsis burden and could specifically include conference lectures, bedside teaching, posters, pocket reminder cards, or other sepsis checklists. Quality improvement plans offer valuable methods to promote quality care in the septic patient (Damiani et al., 2015).

Siontis et al. (2015) describe a quality improvement project evaluating barriers to SB use with a pre and post survey following an educational intervention. The outcomes show that early goal directed therapy compliance improved with a trend toward improved mortality rates. The study supported the use of educational interventions to expand sepsis awareness and improve therapy adherence. The barriers were identified following the pre and post intervention survey and the primary barriers were uncertainty about when the bundle applied to the patient or uncertainty on when the bundle should be used. Educational interventions and bimonthly

feedback were found to be the most helpful. The educational intervention included information about early goal-directed sepsis therapy and the use of the bundle elements. Siontis et al. (2015) report on other studies that also support educational interventions to improve compliance with sepsis bundles with as much improvement as 0% to 51.2% compliance after two years of educational interventions and quarterly feedback. Kuo et al. (2012) also support educational interventions to improve sepsis bundle compliance after review of a survey assessing familiarity with SSC guidelines, acceptance of the guidelines, and personal experience in complying with them.

### **Critical Appraisal of the Evidence**

A literature search was conducted to determine the current state of the evidence regarding initiatives targeting improving compliance with SBs, with a focus on the ED environment. Through a review of the literature, 17 articles were extracted that discussed the importance of and ways to improve SB compliance. The majority of the articles endorse using the SSC SBs and validates decreased mortality with full use of the bundle. The issue of provider compliance is noted in several articles, and is one barrier making it more difficult for evidence to be translated into clinical practice (Damiani et al., 2015). This systematic review found evidence that the most consistent improvements in compliance were in those areas that had relatively no compliance to begin with (Damiani et al., 2015). Educational programs were mentioned frequently as a method for improving compliance. Possibilities include conference lectures, bedside teaching, frequent feedback on compliance, and pocket reminder cards (Damiani et al., 2015; Siontis et al., 2015).

The best clinical practice guidelines, revised in 2012, are within the SSC and are the international guidelines for management of severe sepsis and septic shock (Dellinger et al., 2013). Important recommendations and suggestions include early quantitative resuscitation of

the septic patient during the first six hours after recognition (Grade 1C evidence) and administration of broad-spectrum ATB therapy within one hour of septic shock recognition (Grade 1B evidence) (Dellinger et al., 2013). Also relevant to the ED is that routine screening of potentially infected seriously ill patients for severe sepsis is recommended to allow for earlier implementation of therapy (Grade 1C evidence). While these recommendations are not representing standards of care, they are intended to be best practice. The Joint Commission is working to define core measures based on the studies and guidelines from the SSC (Burney et al., 2012; Dellinger et al., 2013). The SSC maintains that early detection of sepsis and application of SBs improves outcomes and decreases mortality; yet, recognition is an ongoing challenge with sepsis treatment initiation (Dellinger et al., 2013). Hospital-based performance improvement efforts in severe sepsis are also included in the recommendations but are ungraded, indicating the committee did not feel this recommendation was conducive to the GRADE process.

The SSC has incorporated evidence-based guidelines to help decrease mortality from severe sepsis and septic shock through use of early goal-directed therapy (EGDT) (Carlbom & Rubenfeld, 2007; Siddiqui & Razzak, 2010). EGDT is vital for reduction of mortality related to severe sepsis and septic shock. It is based on the early administration of ATBs, corticosteroids, insulin therapy, and protective lung ventilation (Bastani et al., 2012; McRee et al., 2014). All of which can be started in the ED if recognized by providers.

Rivers et al. (2001) conducted a prospective, randomized study of adult patients presenting to the ED with severe sepsis, septic shock, or sepsis syndrome with inclusion criteria of having two of four SIRS criteria with refractory hypotension. This was considered a landmark study demonstrating early sepsis treatment in the ED improved outcomes (Hayden et al., 2015).

The patients were randomly assigned to an EGDT group or to the standard treatment group. In-hospital mortality, 28-day mortality, and 60-day mortality rates were all higher in the standard treatment group. Those patients in the EGDT group received more intravenous (IV) fluid within the first six hours than the standard care group.

Rivers et al. (2001) found that benefits of EGDT are multifactorial regarding outcomes, and are essential to help prevent multi-organ failure. In a study by Rivers et al. (2001), mortality decreased with the use of EGDT to 30.5% from 46.5% compared to standard therapy.

EGDT needs to be implemented before intensive care unit (ICU) admission because severe sepsis may already be developing by that time. Siddiqui and Razzak (2010) also support this based on pathophysiological changes including systemic vasodilation and circulatory collapse, which are impacted by early supportive therapies of aggressive fluid resuscitation and broad-spectrum ATBs. Therefore, early identification and use of EGDT is paramount to hinder disease progression and to decrease mortality in ED patients awaiting admission (Rivers et al., 2001). EGDT can be more prevalent with SB compliance because the bundle holds specific orders for antibiotic administration, fluid resuscitation, and laboratory studies that are in accordance with the SSC guidelines.

One of the strongest pieces of evidence is by Damiani et al. (2015) as a systematic review and meta-analysis of observational studies. Most of the articles were prospective with the rest being retrospective or historically controlled investigations, with a total of 45 articles. There were no eligible randomized controlled trials. While inconsistencies were noted, performance improvement projects were found to be positively associated with improved compliance to SBs and with a reduced mortality in septic patients. Education alone was able to improve compliance with the bundles (Damiani et al., 2015).

A meta-analysis of randomized controlled trials by Gu, Wang, Bakker, Tang, and Liu (2014) reviewed articles looking at the impact of goal-directed therapy (GDT) on mortality of septic patients. Thirteen randomized controlled trials were included in the meta-analysis and these supported GDT as being associated with a reduction in overall mortality in septic patients. While there is obvious supportive evidence in favor of GDT, they note this is also up for debate because another meta-analysis in the same time frame did not show a difference in mortality. One thought behind this was that there was increased awareness around sepsis and GDT based on the SSC, so it is possible that better practice was already being adopted. This would lead to improved outcomes already because the standard of care had already improved (Gu et al., 2014). Regardless, early GDT in septic patients is more beneficial than not and this practice should continue until more randomized-controlled trials can be completed.

Another relevant article by Wang et al. (2013), while a lower level of evidence, does help identify common barriers to implementing sepsis guidelines as knowledge, attitude, and behavioral issues. This is a prospective study looking at mortality before and after the SSC guidelines were implemented in an ED. There was a significant drop in mortality after the SSC guideline and SB implementation in the ED.

Rhodes et al. (2015) discussed results from the International Multicentre Prevalence Study on Sepsis (IMPreSS) showing that compliance with SBs was directly associated with improvement in hospital mortality. This was a large global, prospective, observational, quality improvement study of compliance on SBs including 618 hospitals from 62 countries with 1927 patient records. Results included that compliance with bundle metrics was low, results varied from geographical locations, and when compliance is good there is improvement in overall patient outcomes.

Articles by Jozwiak et al. (2016) and Masterton (2009) endorse the importance of education about SBs and compliance. Bundles ensure consistent use of evidence-based care and are shown to improve patient mortality. Organizational support for educational programs in favor of SBs are vital to the translation of this evidence in to practice.

### **Presentation of Theoretical Basis**

The Iowa Model of Evidence-Based Practice (EBP) to Promote Quality Care provides guidance to healthcare personnel in making decisions about clinical and administrative practices that can impact patient outcomes (Melnyk & Fineout-Overholt, 2015). The model is based on problem-solving steps associated with the scientific process. This model supports identifying “triggers”, or a clinical problem, which can come from current practice. This model can have relevance to either clinical applications or organizational priorities (Melnyk & Fineout-Overholt, 2015). Since triggers are often uncovered by questioning current practice, this is applicable to the proposed project because the question was raised as to why providers are not using the SB order set when it is available and is considered best practice. Using the SB order set would be considered a knowledge-focused trigger as the SB order set is based on national recommendations provided in the SCC (Dellinger et al., 2013) (see Appendix D for model diagram).

Following the algorithm given by the Iowa Model, the knowledge-focused trigger has been identified based on the aforementioned national recommendations, which supports the use of bundled orders as best practice (Melnyk & Fineout-Overholt, 2015). Sepsis identification and management is a top priority for the organization because early identification can improve patient outcomes and has the potential for decreased length of stay. Further, this has possible impact for patient satisfaction, organizational scorecards, and significant financial ramifications



if the organization is not following EBP or meeting the Centers for Medicare and Medicaid (CMS) standards. In this case, the DNP project platform provides the literature review and best practice knowledge to support an evaluation of current practices. The project will endorse use of the SB order set, which is available in practice but is underutilized. Therefore, barriers to using the SB order set will be assessed in hopes of changing the current presumed standard practice of selecting sepsis treatment orders separately to using the SB order set.

The organization strives to provide the highest overall quality care, treatment outcomes, and performance ([wexnermedicalcenter.osu.edu](http://wexnermedicalcenter.osu.edu)). EBP has shown to improve patient outcomes while also impacting the cost of healthcare; yet, barriers to implementation of these practices persist (Brown, 2014). While it does take time for EBP changes to occur, it is frequently too long with estimates of 17 years being required to implement research findings in to practice (Brown, 2014). While there is substantial evidence supporting the recommendations of the SSC bundles, national compliance rates for bundle adherence remain low (Grek et al., 2016).

With sepsis accounting for 1.4 ED visits out of every 1000 adults in the US, this is a profound problem that requires adherence to national guidelines to promote best practice, every time (Stoneking, Denninghoff, DeLuca, Keim, & Munger, 2011). In reality, the issue of SB order set non-adherence is both a problem-focused and knowledge-focused trigger. This is a clinical problem affecting multiple organizational aspects including outcomes, finances, and quality. Additionally, there are already best practice recommendations in place, but they are not being used. The Iowa Model of EBP best serves this project because the primary focus is on quality improvement of both the process of caring for the septic patient and the outcomes. The impact of order set compliance will be multifactorial and imperative to the continued success of the organization.

**Utility and Feasibility**

The proposed project is a quality improvement project and evaluation surrounding the use of the SB in the ED. The utility of the findings will likely be high given there is a low level of use currently. The project is also highly feasible with the use of a focus group that should only utilize minimal resources and time.

The clinical usefulness could be significant given the SB is recommended for best practice in sepsis care, and providers are not utilizing this tool regularly. Benefits include more widespread knowledge of the SB, which can then lead to improved patient outcomes and possible decreased length of stay if sepsis is diagnosed early and treatment is initiated in a timely fashion. Through the use of the SB, all orders are placed at one time, including the repeat lactate level and weight-based IV fluid orders. These are the two areas that the ED is historically lacking in regarding compliance. Other order sets have been utilized in practice before, so the concept of the bundle is not new and should be easily accepted by providers.

**Recommendations**

Recommendations for practice are that the SB be used consistently within the ED environment to improve outcomes and provide evidence-based care. The SB allows for protocolized resuscitation efforts, which when used together, can improve outcomes versus when used alone (Stoneking et al., 2011). Multiple pieces of literature support the use of performance improvement tactics to improve bundle compliance to improve patient outcomes (Bentley et al., 2016; Damiani et al., 2015; Dellinger et al., 2013) (see Appendix C for literature synthesis).

Key stakeholders include the quality improvement team for the ED, medical director of the ED, all providers, and somewhat indirectly are the patients. The quality improvement (QI) team strives to improve SB bundle compliance monthly and keeps providers up to date on

changes related to reimbursement for sepsis care, and what quality metrics are being measured. These metrics include interventions that must be completed within three hours of sepsis identification and include assessment of lactate, obtain blood cultures, and administer broad-spectrum antibiotics. Interventions that must be completed within six hours of identification include fluid resuscitation, vasopressor administration, reassessment of volume status and tissue perfusion, and repeat lactate measurement. The recommendations support increased use of the SB and utilization has the potential to improve metrics in the three and six- hour time frames.

### **Section 3: Methods**

#### **Project Design**

##### **Plan for Evaluation of an Implemented Evidence-based Practice Protocol**

Unequivocally, the evidence supports the use of a SB for patients presenting with symptoms. However, compliance with the SB protocol is low in this ED. This QI evaluation will be specific to this ED and findings will be used to inform redirection of the EDs SB protocol. This QI evidence-based evaluation initiative is not generalizable or transferrable to any other setting or institution. Instead it is an evaluation of an existing evidence-based guideline that is already in place within the ED setting.

##### **Provider recruitment and focus group process.**

The project consisted of focus group interviews assessing the perceived barriers to SB use in the ED and knowledge of the SB. The practice providers were the narrowed population in which the evaluation was implemented. The providers were asked to participate in the focus group discussion via e-mail message (see Appendix F). This e-mail message was sent out three days before the meeting date. The informed consent was also available in physical form at the focus group meeting. The meeting was held in the same facility as the monthly faculty meeting

to prevent any hindrance of travel or unknown location. The interviews were structured around seven evidence-based questions presented to providers in the ED (see Appendix B).

The convenience sample used for the project contained ED providers including attending physicians (APs) and Advanced Practice Providers (APPs), a group comprised of Nurse Practitioners (NPs) and Physician Assistants (PAs). The total population included up to 20 providers who practice in an urban ED in Columbus, Ohio. Efforts to promote honest discussion and minimal risk to participants was anticipated: providers volunteered, were consented, were identified during the focus group by the first name only, and had a pseudonym after that. The DNP moderator reviewed the informed consent for participation (Appendix E). A verbal consent was also read to the participants at the beginning of the focus group by the DNP moderator including the purpose of the project, procedures, incentives, risk, confidentiality, and informed consent (Appendix E). There was no anticipated risk to the providers participating in the focus groups. All transcript data was de-identified and first names only were used during the focus group meeting. This project had the support of the ED medical director (see Appendix I).

All data were collected from the ED providers following informed consent. Ethical and equity issues were limited because all providers receive the same questions and opportunity for providing answers. The focus group was recorded and then transcribed by the DNP student following the session and all information was kept anonymous in the transcription. The group was comprised of providers including APPs and APs. The group was notified that all answers were optional and that they may leave at any time. The DNP student was the lone facilitator and there were no additional incentives offered for participation.

This DNP quality improvement project utilized a qualitative design through the use of focus groups via convenience sampling. The DNP project aimed to assess perceived barriers to

using and knowledge surrounding the SB to provide enlightenment on why there is such a low utilization rate. Approximately 20 providers were afforded the opportunity to respond to the seven questions surrounding SB use within a focus group. Broad themes from focus group results will be disseminated to the provider group via e-mail message following the conclusion of the project. The results may also be presented at a faculty meeting pending time constraints. According to Krueger and Casey (2015), focus groups can be utilized to “explore perceptions, feelings, and thinking about issues, ideas, products, services, or opportunities” (p. 7).

### **Model for Implementation**

The Iowa model was used for implementation of the project because it guides decision making about clinical practices that impact patient outcomes (Melnyk & Fineout-Overholt, 2015). While the focus groups will not offer a specific decision about SB use, the themes that present from the group could have an impact on future clinical practice implementation by notating barriers or lack of knowledge surrounding specific context. The trigger, as proposed by the model, has already been identified as the lack of compliance in using the SB in the ED.

This is certainly a priority for the organization because using the SB early on in the diagnosis of sepsis can impact patient outcomes, based on the timelines of specific interventions. In this case, the SB is already an established practice recommendation so it should be implemented more regularly in practice, yet it is not. The task is to identify why the SB is not being utilized, and then extract themes from the group responses while also considering future implications for department interventions.

### **Project Tool**

The literature review revealed several studies that used various instruments. However a specific tool to evaluate SB use within an ED population does not exist. Based on this review,

the focus group questions were developed using the literature and reviewed by the ED medical director, QI coordinator, and two NPs. The questions used to identify and understand barriers to implementation of evidence-based practice (EBP) for providers in the ED were developed based on barriers noted in the relevant literature. Personal experience was also used in adjunct to the literature. Using Krueger & Casey (2015) as a guideline the following questions were developed:

**1. Are you aware there is a sepsis order set in IHIS (Integrated Health Information Systems)?**

Kuo et al. (2012) discuss that the main barrier identified to bundle implementation is poor awareness and acceptance of the bundle. Runnacles, Roueche, & Lachman (2017) also report this as a barrier to adherence in addition to a lack of familiarity with a specific EBP guideline. Cabana et al. (1999) found that 84% of respondents identified lack of awareness as the barrier to guideline adherence with 89% reporting that lack of familiarity was a barrier. Tufan et al. (2015) reported that the knowledge of physicians caring for septic patients was suboptimal about awareness of sepsis bundles.

**2. Are you familiar with using the sepsis order set? If so, what are your feelings toward it? Also, what do you like best and least about the components of the order set?**

Cabana et al. (1999) found in a review of the literature that lack of agreement with specific guidelines was a barrier to guideline adherence. Some reasons for disagreement include the provider having a different interpretation of the evidence, applicability to practice population, that guidelines were oversimplified would decrease flexibility, or that they reduced autonomy. Lack of agreement was noted as a barrier to specific guidelines in 91% of respondents. Runnacles et al. (2017) list lack of agreement with guidelines in general as a barrier to guideline adherence with variations noted in professional attitudes toward guideline use. Guidelines can

sometimes be discredited due to being too simplistic, inaccurate, or based on the wrong evidence. Also, the ease with which the guideline can be used is another barrier that can impact bundle compliance (Runnacles et al., 2017).

**3. What factors are preventing you from using the sepsis bundle on a routine basis? Do you feel like you need the bundle to place all appropriate orders when managing a septic patient?**

Carlbon and Rubenfeld (2007) report that identification of the septic patient is the most important barrier to implementing early goal-directed therapy, which includes those items in the sepsis bundle. Cabana et al. (1999) and Runnacles et al. (2017) support three primary areas contributing to guideline non-adherence, which include knowledge, attitudes, and behavior. Barriers surrounding knowledge of the guideline include a lack of familiarity and lack of awareness. The volume of information, the time needed to stay informed about the guidelines, and guideline accessibility contributes to both knowledge and attitude barriers. Additional attitude specific barriers include lack of agreement with specific and general guidelines, lack of outcome expectancy, lack of self-efficacy, and lack of motivation due to inertia of previous practices.

Examples include the provider feeling the guidelines are not applicable to the patient, variation in interpretation of the evidence, and that the guidelines challenge autonomy or are too rigid to apply to a specific patient. Lack of motivation encompasses the attitude of doing something the same way it has always been done and supports previous habits and routines. This supports the idea that providers sometimes prefer to place orders individually versus within a bundled element. Behavioral barriers include external barriers, guidelines factors, and environmental factors. Examples include inability reconcile patient preferences with guideline

recommendations, the presence of contradictory guidelines, and perceived lack of time and resources to comply with the guidelines. An additional important barrier to use of the sepsis bundle can be the uncertainty about whether it truly applies to the patient (Siontis et al., 2015).

#### **4. Describe any education you have had regarding the sepsis bundle protocol?**

Poor awareness and acceptance of bundles and guidelines are most commonly the primary barriers to bundle compliance, so addressing these issues should improve frequency of bundle use (Kuo et al., 2012). Education programs are a basic requirement to improve awareness and are essential for successful implementation of bundles and ensuring sustainability (Kuo et al., 2012). This method will also allow for discussion surrounding why evidence-based practice guidelines promote improved outcomes, thus decreasing the influence of habitual practices.

Conversation can impact discordant attitudes surrounding guidelines and associated compliance as well as provide an opportunity for revision of the checklist (Runnacles et al. 2017). Siontis et al. (2015) additionally support educational interventions for improving guideline adherence and mentions instructions on how to access the order set with step-by-step instructions. Pocket cards were also used in this study, which included the definition of sepsis, and these were placed on computers around the clinical area to provide quick references. Feedback sessions for clinicians were additionally helpful and were held on a regular bi-monthly basis (Siontis et al., 2015).

#### **5. What are some benefits associated with using evidence-based practice sepsis management in the ED? What outcomes would you expect with use of the sepsis bundle versus not using the bundle?**

Clinical practice guidelines (CPG) are “systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical



circumstances” (Cabana et al., 1999, p. 1458). The quality of care should be improved with the use of CPG by decreasing variation in care and advancing the implementation of current treatments into daily practice (Cabana et al., 1999). Studies have shown that the actual delivery of evidence-based care is unreliable and only occurs about 50-55% of the time (Runnacles et al., 2017).

While early goal-directed therapy in sepsis is supported by national guidelines, compliance is rare even though there is a direct correlation with reduction in mortality and organ failure (Carlbohm & Rubenfeld, 2007). Sepsis is an international problem that affects many ED patients and accounts for over 200,000 deaths in the United States yearly (Bastani et al., 2012). Therefore, improving compliance with recommended guidelines and tools such as sepsis bundles can decrease sepsis-associated morbidity, mortality, and healthcare costs.

**6. Discuss any differences between how sepsis should be managed versus other time-sensitive emergencies, such as myocardial infarction (MI) or cerebrovascular accident (CVA), in the ED?**

Follow-up questions: Do you feel sepsis shares the same importance of time-sensitive identification as an MI or CVA? What challenges do you face when trying to identify sepsis in the ED versus MI or CVA?

Sepsis is a condition that benefits from rapid identification and intervention, as are other conditions including trauma, MI, and (CVA). These have all had improved outcomes secondary to early diagnosis and care in the ED. Unfortunately, rapid identification of the septic patient is often more difficult because the presentation is likely to be more subtle than that of a patient experiencing an MI or CVA, with less concrete evidence of a disease process available immediately. Early recognition is a vital component of sepsis bundle recognition and is often the

greatest challenge (Dellinger et al., 2012). Some providers feel that sepsis requires more ED resources, nursing staff and maintains less hospital support and positive feedback than other conditions (Carlbon & Rubenfeld, 2007). These influences reduce the emphasis on early sepsis identification and management because there are no direct incentives for improving compliance with sepsis care, yet there is often great financial burden and repercussions for the hospital organization.

**7. How familiar are you with the surviving sepsis guidelines and recommendations? List or describe some of the specific recommendations for initial management and resuscitation.**

Utilization of the sepsis bundles can lead to sustainable quality improvement in sepsis care and is associated with decreased mortality (Dellinger et al., 2012). Lack of familiarity with the bundles is directly correlated with inadequate physician knowledge, which is a direct barrier to guideline adherence and actually, lack of familiarity is more common than lack of awareness (Cabana et al., 1999). Casual awareness does not confirm understanding of clinical guideline recommendations or appropriate application in practice (Cabana et al., 1999). Runnacles et al., (2017) describe the awareness to adherence model as a framework to understand why providers do not follow recommended guidelines. This suggests that providers need to initially be aware of the guideline, then agree with them, decide to implement them, and finally, regularly utilize them when appropriate.

At the beginning of the focus group, the DNP moderator will ask for basic demographic data that will be identified only by an ID number indicating Focus Group number based on the total number of participants in that group. Appendix G shows the focus group demographic survey.

**Facilitators**

The ED is open to and supports change as this department strives to provide the best possible care by doing what is right for the patient, and is supported by an academic institution where change is constant. The Ohio State University Wexner Medical Center (OSUWMC) offers a commitment to patients to provide high-quality care, treatment outcomes, and performance (Retrieved from [wexnermedicalcenter.osu.edu](http://wexnermedicalcenter.osu.edu), 2017). The ED providers exhibit an appreciation for evidence-based practice because they are referencing organizational guidelines and recommendations daily to improve the quality of care delivered for multiple processes including infection, psychiatric illness, and other chronic diseases. There are frequent notifications to providers about changes in practice, for example, antibiotic choices. There is an antibiotic algorithm updated by the pharmacy that provides the best practice information, which is constantly referenced by providers to determine what the best choice is for different diagnoses.

Providers are also supported and encouraged to attend events for continuing education throughout the year. During faculty meetings, there are compliance audits completed for sepsis and myocardial infarctions with corresponding reports disseminated to the providers. These reports encourage questions and discussions about what can be improved. Overall, the location and organization are constantly adapting and growing with the changing guidelines and information making it ideal for the DNP project. It is expected that the providers will be surprised by the lack of use with the SB and will be eager to improve their compliance as well as patient outcomes.

Facilitators for the project included several people that are integral to the department including the medical director of the ED, the quality improvement and compliance coordinator, and the DNP student. All of these individuals are currently engaged and are aware of the project.

All of the other ED providers are additional facilitators that will be vital following the focus group because they can influence their peers and colleagues to become engaged and participate in practice changes.

### **Barriers**

One of the greatest potential barriers to the proposed project includes lack of provider interest, which could lead to a small sample size of those participating in the focus group. To combat this possible obstacle, the DNP sent a notification e-mail about the focus groups three days prior to the scheduled faculty meeting. There was also a verbal announcement during the February faculty meeting regarding the upcoming focus group in March. The DNP student also used word of mouth within the workplace to encourage provider participation. The ED director was additionally asked to support the focus group and encourage participation.

### **Outcomes**

The outcomes to be evaluated in this project include perceptions of and barriers to using the SB. Other outcomes to be assessed include awareness of the SB, utilization and feelings toward the SB, factors preventing use, and perceived facilitators of using the SB. Additionally, familiarity with the SB and the perceived importance of sepsis treatment were evaluated via the focus group questions. Themes were extracted from the focus group discussions after transcription occurred, following the meeting. These were used to develop recommendations for improving SB use while accounting for the ED providers' perceptions of sepsis, the SB, and barriers to use.

### **Data Collection**

The DNP student prepared a disclosure and consent document explaining the purpose, process, and objectives of the project (see Appendix E for document). This was sent out via e-

mail message three days prior to the scheduled faculty meeting and focus group meeting. This was also available at the location of the focus group meeting. Consent to participate was assumed if the provider participated in the focus group. There was only one focus group meeting and this included 7 open-ended questions with follow-up questions when needed to encourage dialogue. There was ample time allotted for discussion following each question. Identities of all participants were kept anonymous and were identified as Provider 1, Provider 2, Provider 3, etc. on the transcription.

Data was collected from one focus group over the course of a one-hour time period. This focus group was held from 7:45AM- 8:45AM, the hour immediately prior to the regularly scheduled monthly faculty meeting. The meeting was held in a different room than the regular faculty meeting, but still in the same building. The discussion was audio-recorded and transcribed verbatim and answers were evaluated to identify similarities and themes when applicable (Krueger & Casey, 2015). All focus group information was kept confidential and was kept in a locked area. Findings from the focus group transcription were analyzed for frequencies, specificity, and perception of importance, and then summarized in a descriptive narrative. Krueger & Casey (2015) describe an analysis strategy for focus group data that was used for this quality improvement evaluation. This approach identifies themes across groups and this was completed with the transcript from the focus group. This was achieved by separating each question to be identified by a different color of paper, and then the answers and themes were similarly categorized using different colored sticky notes placed in groups on each corresponding question page. This allowed for quick recognition of similar answers per question since they were color-coded. All focus group information including demographic forms, notes, and the recording were destroyed upon completion of the project. All resulting recommendations will be

shared with the ED provider group, quality improvement coordinator, and ED nurse manager at a future faculty meeting or via e-mail.

## **Section Four: Findings**

### **Sample Characteristics**

Ten ED providers including attending physicians (AP) and Advanced Practice Providers (APP) participated in the focus group (see Appendix H, Figure 1.3). A majority of participants were between the ages of 31-35 (see Figure 1.5) with 1-5 years of experience in the ED (see Appendix H, Figure 1.1). Most providers worked between 14-17 shifts in the ED per month (see Figure 1.2) and the bulk of providers present were APs or NPs, with just slightly more female presence (see Appendix H, Figure 1.4). Two providers were late to the focus group meeting and were unable to answer all of the discussion questions.

### **Outcomes**

In the first coding review, there were at least five major themes identified that were consistent among the participants of the focus group. Most providers exhibited an awareness of the SB but felt there were too many unnecessary orders within the SB causing a feeling of cluttering and hindering compliance. The first review of coding facilitated the second review and through data redundancy, concepts were combined leading to approximately six major themes being identified. These themes are reported below but include provider discontent with how minimally customizable the SB is, the dislike in having to uncheck multiple boxes within the SB, and that sepsis is often very difficult to identify early on. Within the second round of coding, an additional theme came about that providers would prefer to just use their favorites list within IHIS to place all orders, believing this way is faster than using the SB.

**Question 1: Are you aware there is a sepsis order set in IHIS?**

Among the providers present, 80% (n=8) of the providers reported awareness of a sepsis bundle while 20% (n=2) were unaware of its existence.

**Question 2: Are you familiar with using the sepsis order set? If so, what are your feelings toward it? Also, what do you like best and least about the components of the order set?**

Considering that not all the providers were aware there was a SB, only 63% (n=5) stated they were familiar with the SB with 38% (n=3) not being familiar at all. Of the five providers who reported familiarity, a repeated theme among the responses was that three providers felt there were numerous unnecessary nursing orders, which hindered the choice to use the SB. One provider reported the SB was cluttered and was overwhelming with multiple orders to consider. Another provider stated the theory behind the SB was good but all the different choices, not necessarily required for ED care, were more of a hindrance and a deterrent. A third provider felt it was faster to use their “favorites” list in the IHIS system rather than working through the SB orders and unclicking all the pre-selected items in the list. A fourth provider agreed the SB was useful, well organized, and appreciated that the antibiotic selection, fluid orders, and repeat lactate were offered within the SB.

One provider felt the best component of the SB was that the ordering provider does not have to remember all the separate details and orders needed when caring for the septic patient. The reported negative themes included the multiple extra nursing orders which were felt to be unnecessary, the fact that the SB was not customizable as other order sets are, and that they hate to uncheck the preselected items included in the SB when they did not want those particular orders.

**Question 3: What factors are preventing you from using the sepsis bundle on a routine basis? Do you feel like you need the bundle to place all appropriate order when managing a septic patient?**

A common theme was reported by 80% (n=8) of the providers, which was that it is easier to order the different components separately rather than using the SB when caring for the septic patient. The same number of providers felt they did not need the SB to place all the appropriate orders. Some comments included that the provider is just more accustomed to placing all orders separately vs. using a bundle for complicated medical patients and that many providers already have the same orders in their “favorites” list in IHIS so they can place the orders faster than working through the SB pre-selected orders and deciding if they want all the items already chosen.

Another theme included that it is very difficult to identify the septic patient unless they are blatantly sick upon presentation, so often times they will not use the SB right away due to uncertainty of the diagnosis. Two providers stated they would prefer to wait to order antibiotics until they try and find the source of the infection rather than jumping to broad-spectrum antibiotics. In that case, the providers were unlikely to return to the SB to place the antibiotic orders after a source was identified. Two additional providers stated they would not use the SB on a routine basis because that is not what they are used to doing; bundles were not always an option in the electronic medical record from when they started practicing in the ED. One provider did endorse they felt the weight-based fluid order was forgotten most of the time because they were in such a habit of just ordering one or two liters of fluid without calculating the weight. Another comment was that there was no reason to endorse use of the SB because as a



team they was felt they were hitting the targeted goals already regarding care of the septic patient.

**Question 4: Describe any education you have had regarding the sepsis bundle protocol?**

There was no education surrounding the sepsis protocol reported by 60% (n=6) of providers. The other 20% (n=2) thought they had heard something in a staff meeting when reviewed sepsis related metrics. One provider who reported to have not had any education on the SB while working as a providers stated they only received education about sepsis while in school and reported uncertainty as to what sepsis criteria the ED was currently using.

**Question 5: What are some benefits associated with using EBP sepsis management and order sets in the ED? What outcomes would you expect with use of the sepsis bundle vs. not using the bundle?**

All the providers present to answer this question (n=8) reported they felt there would be better patient outcomes with use of the SB along with work being more efficient, and receiving more reimbursement for use of the SB. One provider commented they felt the SB might be geared toward the inexperienced provider because these providers may not know what to order when caring for the septic patient. Whereas, the experienced provider will likely have a preferred way of placing orders when caring for these patients and feeling like they already know what to order without the SB. One provider commented that there may not be any patient oriented benefits, but there would be positive outcomes related to CMS compliance and better results in the metrics of utilizing the SB. The same provider felt there were currently no issues with poor outcomes when caring for the septic patients through the ED, so it is harder to rationalize using the SB over placing the orders from a “favorites” list in IHIS.

**Question 6: Discuss any differences between how sepsis should be managed vs. other time sensitive emergencies, such as myocardial infarction (MI), or cerebrovascular accident (CVA), in the ED. For example, do you feel sepsis shares the same importance of time-sensitive identification as an MI or CVA? What challenges to you face when trying to identify sepsis in the ED vs. an MI or CVA?**

One hundred percent (n=10) of the providers answered these questions with the primary theme among all of them being that sepsis is hard to identify in the ED most of the time. Septic patients present differently and while some patients appear septic based on vital signs of fever, tachycardia, and low blood pressure, the providers recognized this could also be a young patient with an eventual diagnosis of influenza or strep pharyngitis, which would not really require them to receive all the orders in the SB. There was discussion among the providers with this scenario related to whether it is appropriate to presumptively initiate all the SB orders on every patient with abnormal vital signs during the triage process, or should the patient be evaluated by a provider first given the wide range of possible diagnoses. One provider commented that sepsis presents somewhat on a continuum of symptom progression, whereas, a CVA or MI is immediately present and apparent at the time of arrival to the ED. This again supports the overwhelming theme that sepsis is difficult to identify because “you can’t see sepsis coming.”

Most of the providers felt there should not be any difference in how sepsis is managed vs. other time sensitive emergencies, but an MI and CVA are often more readily identified upon presentation. Three of the providers agreed that the evidence shows mortality is high regarding sepsis, yet they felt sepsis was slightly less important than MI or CVA because an intervention is often available for those two emergencies. Although, these providers still commented that the end organ damage associated with sepsis is somewhat preventable but there is no clear-cut

intervention to stop the acute progression of those processes. MI and CVA care are well standardized within the medical system, but one provider stated that sepsis management is just difficult to standardize secondary to the many possible presentations.

**Question 7: How familiar are you with the Surviving Sepsis Guidelines and recommendations? List or describe some of the specific recommendations for initial management and resuscitation.**

One provider reported moderate familiarity with the guidelines and only two of the providers were able to list the recommendations of weight based fluid resuscitation, a repeat lactate and what some of the specific vital signs were to identify the septic patient. One other provider added that early antibiotics were important and part of the guidelines. Forty percent (n=4) of the providers commented that they were unsure what the current recommendations were because they change so frequently. Overall, there was an inconsistency in the knowledge of the currently guidelines. One provider stated they just “know a septic patient” based on how sick the patient appears and use more clinical judgment and gestalt to determine if a patient is septic to the point of needing the SB.

### **Discussion**

The majority of providers reported awareness and moderate familiarity with the SB but reported discordance with the configuration of the SB, which deterred utilization. There has been little to no education on the SB itself and the guidelines and criteria for identify a septic patient change frequently enough that providers are unsure about what are the current recommendations. The majority felt sepsis is important to identify early, but it is very difficult to do so based on the multifaceted presentations.

An additional question offered by the DNP moderator that came up at the end of the discussion asked what would help the providers use the SB more regularly. The most supported comment by the providers included paring down the SB to include only the necessities and providing the option to customize the bundle orders while also allowing the provider to “check” the orders vs. “unchecking” the already selected orders. Over half of the providers felt the SB order set was too long to look through when trying to quickly place orders for a critically ill patient, so they ended up just not using the bundle since they could find the same orders faster in their “favorites” list. Many felt it took longer to uncheck boxes while reading all the separate orders, rather than being able to select what they actually wanted at that time. There is an order set in place currently to help the providers care for psychiatric patients which many of them stated was a favorite and easy to use because it was customizable, and it was easy to select what was wanted vs. removing what orders were not wanted at a certain time.

One provider commented that they always had difficulty ordering weight based fluid because the patient weight was usually not in the computer system, and the computer would not allow the provider to complete the ordering process without entering a weight. This created a barrier, which caused the provider to just order a bolus rather than the preferred weight based fluid resuscitation. Forty percent (n=4) of providers added they were often uncomfortable ordering the weight based fluid resuscitation because the amount of fluid seemed disproportionate to what they would usually order, or they were afraid to overload the patient with too much fluid. They often erred on ordering a smaller amount of IV fluid and then reassessing to see if there was any positive patient response to fluid resuscitation.

Another suggestion was an alert that would pop-up for the provider when a patient presented with abnormal vital signs. Over half of the providers felt this might be useful, but also

felt they were already inundated with several pop ups during their shift so they might get fatigued and not always pay attention to what the pop up was about. Other providers thought this could be useful as a one-time occurrence so that the computer system did not continually ask the provider about starting the SB every time they entered the patient chart.

### **Limitations**

There were several limitations surrounding the focus group including the group size and variety of experience among the group members. Ten out of a possible 20 providers were present for the focus group, two of which were late and did not have time to answer all questions. Some of the providers present may have not felt comfortable answering all of the proposed questions if they did not have much experience in the ED or much experience using the SB. Some providers may not have attended for the same reasons, possibly believing they would provide any contribution to the discussion. Also, some of the ED providers present may have felt some of the other providers were dominating the discussion, and they may have not wanted to risk providing an opposing opinion.

Another potential limitation is that the date for the monthly faculty meeting changed for the month of March, moving from the first Thursday to the second Thursday. This created a conflict for some because they had not requested off the date for the meeting since it changed, and some ended up having to work all night prior to the meeting time. Also, the regular faculty meeting room changed so the focus group was held in a completely different room although still in the same building. Additionally, the weather may have played a significant role on the day of the focus group because there was some severe weather on that day causing most of the focus group participants to be late or not be able to make it at all. This also created a decreased amount of time for the focus group discussion because the DNP moderator waited from some providers

to arrive since they had notified her they were on their way. The time frame for the focus group dropped from 60 minutes to 30 minutes, although the group was able to answer all the questions with seemingly adequate discussion.

## **Section 5: Recommendations**

### **Implications for Practice**

The quality improvement project did not identify any specific practice change recommendations, but barriers to SB compliance were certainly identified by frequently reported themes during discussion. The essential barriers to decreased utilization of the SB included the providers feeling the SB was more of a hindrance than helpful because it was not customizable and took longer to read through all the pre-selected orders than to just select everything separately outside the order set.

Also, education about the presence, components, and importance of the SB need to be addressed, which should eventually help improve compliance by increasing the knowledge base. There were three responders who did not know there was a SB and those providers had been working for more than one year in the department. Improving education about the presence of bundles may need to become a standard part of the orientation process in the future.

An indirect theme from the group was that the providers like to use order sets because they use them for other patient populations who frequent the ED, but the overarching theme was that those order sets are user-friendly. In alignment with this was that several providers were uncertain as to what the current guidelines stated regarding recognition of sepsis. The recommendations change frequently when new criteria are presented and updated, but these are not always relevant to the ED environment. Streamlining the guidelines may have a significant impact on both SB compliance as well as improving identification of the septic patient if the

criteria are clear, concise, and remain unchanged over a period of time. Frequent updates are often needed, but this adds to the confusion of the already difficult identification of the septic patient.

This project would benefit from a continued phase of discussion to narrow down what exactly providers would like to see in the SB order set to improve compliance. This may need to involve the information technology (IT) specialists to help make the SB within the ED very specific to ED providers rather than trying to make one order set for both the inpatient and ED teams. The focus of the ED is usually based on throughput and how providers can work more efficiently to make a diagnosis and determine a disposition. By streamlining the SB for the ED, this could certainly improve the efficiency of the department and also the hospital. Looking at efficiency with and without utilizing the SB would be an interesting follow up study to this quality improvement project. The SSC guidelines currently support the use of bundles to promote quality and timely care. Lower patient mortality has been reported with higher compliance of the SB (Rhodes et al., 2017).

### **Doctor of Nursing Practice Essentials**

#### **Essential I: Scientific underpinnings for practice.**

Translating evidence in to practice is the basis for the DNP project and what drives the progression of quality patient care. The SB, when used regularly, has been shown to decrease mortality and improve department efficiency. This is a clear example of a scientific foundation for improving current ED practices while helping improve patient outcomes. The literature review completed for this quality improvement evaluation, guideline review for recommendations, and use of the Iowa model are all additional exemplars of utilizing and implementing science in to practice.

**Essential II: Organizational and systems leadership for quality improvement and systems thinking.**

This quality improvement project encompasses Essential II in that it was a requirement for the DNP student to understand the balance of productivity while sustaining and improving patient care. The guidelines support the use of the SB so it was imperative to understand how the ED can be more productive and efficient to provide the best care for the septic patient. Also, it was essential to carry a basic understanding of what barriers might exist in order to focus the questions down for the group to obtain meaningful feedback for future change. Coordination of the focus group also supported organizational leadership by realizing who were key stakeholders in this change evaluation process. The topic of sepsis bundle compliance is certainly a systems issue because outcomes from sepsis care impact organizational outcomes and future success.

**Essential III: Clinical scholarship and analytical methods for evidence-based practice.**

With scholarship and research as the hallmarks of doctoral education, improving compliance with a research-based guideline is fundamentally supported by the DNP Essentials. The goal of this project was to determine barriers to utilization of an already present evidence based guideline for sepsis care in the ED. In fact, the research is already in practice, but awareness and utilization is low. Based on feedback, it may be feasible to update the SB in a way that encourages providers to use it more frequently; therefore, helping sustain evidence based recommendations and improving patient care.

**Essential IV: Information systems/technology and patient care technology for the improvement and transformation of health care.**



The SB is a clinical decision tool to support patient care and outcomes. Through theme analysis of focus group answers, a repeated concern was related to the technology based order set. Currently, the efficacy of the SB is poor because of low utilization secondary to some technology related issues. These could be adjusted with the possibility of improved compliance and utilization with subsequent improvements in patient care and outcomes. The SB is an evidence based recommendation supported by decreased mortality and improved outcomes, so if even minor changes can improve provider compliance, this will be a meaningful adjustment with support from this essential.

**Essential VI: Interprofessional collaboration for improving patient and population health outcomes.**

Healthcare professionals require collaboration to be successful for both themselves and their patients. This essential was exemplified in this project by the leadership of the DNP and the collaboration encouraged among the ED providers and leaders of the organization. This was truly interprofessional because multiple individuals were involved along the continuum of this project including quality improvement personnel, the director of the ED, nursing manager, and IT at one point. Effective communication and open collaboration were essential to the success of this project, and will continue to be necessary for prospective change.

**Essential VII: Clinical prevention and population health for improving the nation's health.**

In order to improve the health status of the population, optimization of current resources is vital. This includes the SB and increased frequency of use to promote decreased mortality, improve patient outcomes, and improve organizational success. The SB is part of an evidence-based set of recommendations that has been evaluated for many years, and while adjustments

have been made, the recommendations are generally the same. Lack of utilization of the SB can be considered a gap in care of individuals, which is how this project embodied this DNP essential in supporting population health.

### **Essential VIII: Advanced nursing practice.**

This essential was at the core of this quality improvement project because the DNP has a breadth of experience in the studied environment and was able to predict a variety of possible barriers to SB use prior to implementing the project. Assessment of the problem was completed and nursing science was used along with advanced levels of systems thinking to formulate a plan and hypothesize solutions.

### **Conclusion**

As the evidence has shown, sepsis is a cause of high mortality with a great deal of support for early identification of the disease process. Quality improvement methods to improve early identification and treatment of sepsis, such as sepsis order sets or bundles, have been developed to help reduce sepsis-related mortality (Rhodes et al., 2015). During this evaluation of barriers to SB compliance in the ED, provider knowledge was actually high but utilization was low for several reasons including feeling the SB was cumbersome, inefficient, or just not used frequently because identification of sepsis is often so difficult. There was also a minority of providers who were not aware there was a sepsis bundle to utilize while the majority did not feel as though they needed it to get all the appropriate orders in place. Literature review also supported these barriers but the SSC continues to endorse that early identification and treatment is shown to improve patient outcomes including reducing mortality. As Runnacles, Roueche, & Lachman (2017) state, strategies to improve guideline usage often require focus on dissemination

and education. It is the responsibility of all providers to ensure use of the SB is consistent and its use should be encouraged just as frequently as is use of other order sets.

This quality improvement project did address the objectives previously listed in that barriers to sepsis bundle compliance were identified and will deserve further investigation in the future. Several barriers identified could possibly be resolved with involvement of IT personnel making seemingly small changes to the SB. These would include allowing for the SB to be customizable and allowing providers to select vs having to unselect what they want to order for the patient.

Sepsis incidence and cost are on the rise and with the ED being the primary point of contact for many of the septic patients, ED providers have a responsibility to provide the best quality care in the most efficient manner. While sepsis is certainly recognized as being difficult to identify, utilizing the SB regularly will support improved outcomes for both the patient and the organization. Minimizing identified barriers could allow for improved SB compliance, improved patient outcomes including decreased mortality, and positively impacting reimbursement for the organization while supporting the national recommendations for sepsis care.

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## Appendix A

The Ohio State University College of Nursing

### Human Subjects Research Assessment Form

**Instructions:**  
 1. Please complete the requested project information, as this form may be used for documentation that neither IRB review nor an exemption is required.  
 2. Please select the appropriate answers to each question in order as they appear. If all of the questions are answered without receiving an error message, the form must be printed AND signed as certification that the project is "not human subjects research," and does not require IRB review or exemption.  
 If you are unsure how to answer any of the questions, please contact ORRP for additional guidance.

**Project Information:**

Name of PI, advisor, or mentor:

Title of Project:

Brief Description of Project/Goals:

[Help](#)

**Questions:**

- Will the project involve testing an experimental drug, device (including medical software or assays), or biologic?  
☐ Yes  
☒ No [Help](#)
- Has the project received funding (e.g. federal, industry) to be conducted as a human subjects research study?  
☐ Yes  
☒ No [Help](#)
- In addition to any other purposes, is the project intended to develop or contribute to generalizable knowledge (e.g. testing a hypothesis) AND/OR has the project been designed in such a way that the findings will be generalizable (e.g. randomization of subjects; comparison of case vs. control)?  
☐ Yes  
☒ No [Help](#)
- Will the results of the project be published, presented or disseminated outside of the institution conducting it?  
☒ Yes  
☐ No [Help](#)
- Will the project occur exactly as proposed regardless of whether individuals conducting it may benefit professionally from it?  
☒ Yes  
☐ No [Help](#)
- Is the project intended to improve or evaluate the practice or process within a particular institution or a specific program?  
☒ Yes  
☐ No [Help](#)

**If no message appears above indicating the certification is not valid, IRB Review is not required because, in accordance with federal regulations, the project does not constitute human subjects research as defined under 45 CFR 46.102(d). Print a copy of this form, have it signed by the PI, advisor, or mentor, and save with your files. This serves as record that IRB review is not required for this project.**

What do my results mean?  Signature:  Current Date:  [Print Form](#)

## Appendix B

## Focus Group Questions

1. Are you aware there is a sepsis order set in IHIS?
2. Are you familiar with using the sepsis order set? If so, what are your feelings toward it? Also, what do you like best and least about the components of the order set?
3. What factors are preventing you from using the sepsis bundle on a routine basis? Do you feel like you need the bundle to place all appropriate orders when managing a septic patient?
4. Describe any education you have had regarding the sepsis bundle protocol?
5. What are some benefits associated with using evidence-based practice sepsis management and order sets in the ED? What outcomes would you expect with use of the sepsis bundle versus not using the bundle?
6. Discuss any differences between how sepsis should be managed versus other time sensitive emergencies, such as myocardial infarction (MI) or cerebrovascular accident (CVA), in the ED?  
Follow-up questions: Do you feel sepsis shares the same importance of time-sensitive identification as an MI or CVA? What challenges do you face when trying to identify sepsis in the ED versus MI or CVA?
7. How familiar are you with the surviving sepsis guidelines and recommendations? List or describe some of the specific recommendations for initial management and resuscitation.

## Appendix C

## Summary of Literature on Barriers to Sepsis Bundle Compliance

<b>Authors</b>	<b>Year</b>	<b>Title</b>	<b>Objectives</b>	<b>Method/Measures</b>	<b>Results</b>
Bentley et al.	2016	Seeking Sepsis in the Emergency Department- Identifying barriers to deliver of Sepsis 6	Improve compliance by evaluating application of Sepsis 6 bundle within one hour of ED triage time (n=155)	Retrospective data collection from April-October 2012; data collected for ED arrival time, area of ED initially managed; time of first medical assessment, time of first senior clinician involved, SIRS criteria present at triage, Scottish Early Warning Score at triage, element of Sepsis 6 completed with timings	<p>The most significant influences on compliance included the department in which the patient was managed, the presence of pyrexia, and the time to first medical/senior assessment.</p> <p>To improve compliance, departmental education and target-driven clinical care were addressed through ongoing audits of compliance and regular feedback to the clinical team. Compliance increased from 51% to 74.3%.</p> <p>Pre and post surveys were used.</p>
Bruce et al.	2015	Impact of nurse-initiated ED Sepsis Protocol on compliance with sepsis bundles, time to	Evaluate impact of a nurse-initiated ED sepsis protocol on time to initial antibiotic administration; ascertain compliance with 3-hour	Retrospective chart review of patients discharged with diagnosis of sepsis or septic shock. Pre and post-protocol implementation data examined compliance with 3-hour bundle targets and patient	Serum lactate measurement and median time to initial ATB administration improved significantly after protocol implementation.

		initial antibiotic administration, and in-hospital mortality	SSC targets; identify predictors of in-hospital sepsis mortality (n=195)	outcomes.	No in-hospital mortality rate differences between pre and post implementation groups
Damiani et al.	2015	Effect of performance improvement programs on compliance with sepsis bundles and mortality: A systematic review and meta-analysis of observational studies	To perform a systematic review of studies evaluating the impact of performance improvement programs on compliance with SSC guideline-based bundles and/or mortality (n= 50 observational studies)	Articles chosen included those on adult patients with sepsis, severe sepsis or septic shock that evaluated changes in compliance to individual/combined bundle targets and/or mortality following implementation of performance improvement programs.  Interventions included educational programs, process changes or both	Performance improvement programs were associated with increased compliance with the complete 6-hour bundle and the complete 24-hour bundle, and with a reduction in mortality.
Dellinger et al.	2013	Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock:2012	To provide an update to the SSC guidelines for management of severe sepsis and septic shock published in 2008	Authors followed principles of Grading of Recommendations Assessment, Development and Evaluation (GRADE) system to guide assessment of quality of evidence to determine strength of recommendations.	Multiple treatment recommendations.  Recommend routine screening of potentially infected seriously ill patients for severe sepsis to increase the early identification of sepsis and allow implementation of early sepsis therapy  Performance improvement efforts in severe sepsis should be used to improve patient outcomes

Gu et al.	2014	The effect of goal-directed therapy on mortality in patients with sepsis- earlier is better: a meta-analysis of randomized controlled trials	Perform meta-analysis to integrate findings of the SSC guidelines and findings from the Protocolized Care for Early Septic Shock (ProCESS) trial with existing literature to evaluate the effect of goal-directed therapy (GDT) on mortality due to sepsis.  (n=13 trials, 2,525 patients)	Database searches along with randomized controlled trials comparing GDT with standard therapy or usual care in patients with sepsis were used.	GDT significantly reduces overall mortality in septic patients, especially with early initiation.
Head & Coopersmith	2016	Evolution of sepsis management	To evaluate progress from early goal-directed therapy to personalized care		Supports gold standard for initial sepsis therapy is SSC bundles  Compares sepsis to MI, stroke, and trauma  Discusses changes in management over time; increased identification of sepsis
Jozwiak et al.	2016	Implementing sepsis bundles	Defines sepsis bundles and explains benefits; discusses importance of compliance with bundles		Supports implementation of sepsis bundles results in a decrease in mortality and to better outcomes in septic shock patients.  Benefits mainly depend on

					compliance with sepsis bundles, therefore noting importance of education programs surrounding bundle use.
Krive et al.	2015	Effectiveness of evidence-based pneumonia CPOE order sets measured by health outcomes	<p>Analyze benefits of community acquired pneumonia order sets as measured by mortality, readmission, and length of stay (LOS) outcomes</p> <p>Mortality: order set n=362/no order set n=4725</p> <p>Readmission: order set n=556/ no order set n=4531</p> <p>LOS: order set n=362/no order set n=4725</p> <p>Comorbidity/complications: order set n=556/no order set n=4427</p>	Retrospective examination of computerized physician order entry (CPOE) data from five years and four hospitals. Mortality and readmission benefits were analyzed by comparing 'order set' versus 'no order set' groups of adult patients.	Patient treatment orders placed by electronic sets were effective in reducing mortality, readmissions and LOS.
Kuo et al.	2012	Compliance and barriers to implementing the sepsis resuscitation	Investigate compliance with the sepsis resuscitation bundle and the barriers to its implementation for	Initially, a retrospective review of patients who were admitted to the intensive care unit from the general medical ward due to septic shock was completed. Then	<p>Compliance with the bundles was low on general medical wards.</p> <p>Educational programs to</p>



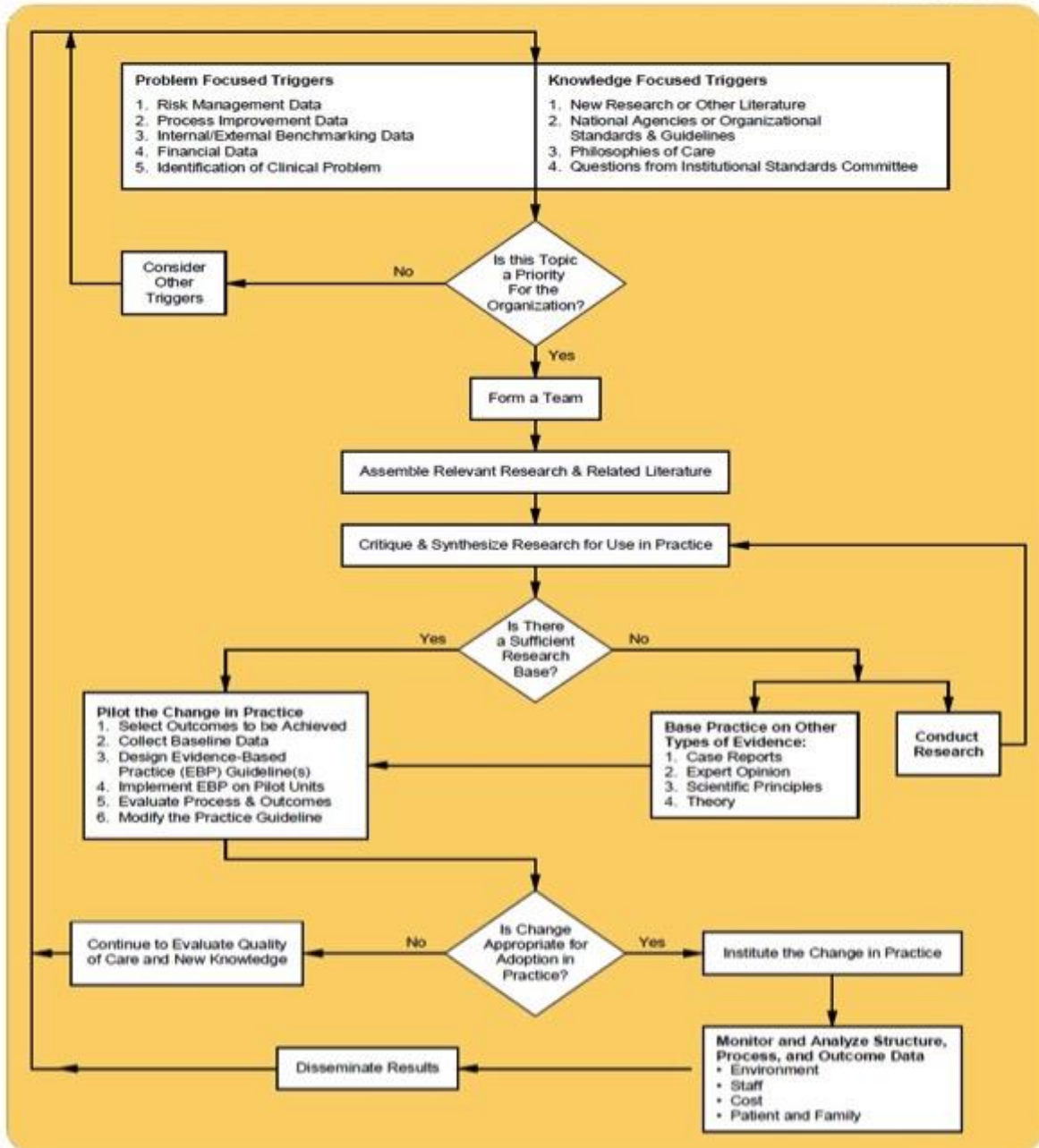
		bundle for patients developing septic shock in the general medical wards	patients developing septic shock in medical wards n=40 patients-chart review n=135 providers	compliance rates with the sepsis bundle components were assessed. Lastly, a survey interview was given to residents and senior physicians assessing familiarity with bundle components and SSC guidelines	improve awareness and acceptance of sepsis bundles should be considered.
Masterson	2009	Sepsis care bundles and clinicians	Defines care bundles and clinician involvement in change		Supports that sepsis care bundles have an important role in future infection management and require organizational investment.  Clinical practice must change for this to happen, dependent upon clinicians' willingness to adopt changes
Patient Safety Monitor Journal	2015	Process improvements in the ED increase sepsis bundle compliance, reduce mortality	Supports that improving compliance with the sepsis 3-hour bundle, patient mortality can be significantly decreased		Provides statistics about sepsis cost  Sepsis continues to plague healthcare because of inability to manage application of best practices consistently and timely
Rhodes et al.	2015	The surviving sepsis campaign bundles and outcome: results from the International	Improve understanding of how compliance with the 3-hour and 6-hour SSC bundles are used in different geographic areas, and how this	Global, prospective, observational, quality improvement study of compliance with the SSC bundles in patients with severe sepsis or septic shock	Compliance with all evidence-based bundle metrics was not high  Patients whose care included compliance with

		Multicentre Prevalence Study on Sepsis (the IMPReSS study)	relates to outcomes  n=1794 patients from 62 countries		these metrics had a 40% reduction in the odds of dying in hospital with the 3-hour and 6-hour bundle
Siontis et al.	2015	Multifaceted interventions to decrease mortality in patients with severe sepsis/septic shock- a quality improvement project	Evaluate staff education on early-goal directed therapy (EGDT) and compliance with order sets  n= 56 providers-pre test n=44 providers-post test (170 total possible providers)	Pre and post intervention survey to evaluate barriers for sepsis bundle compliance  Educational intervention of a presentation, bimonthly feedback, and pocket cards were used for interventions	Educational interventions can be used to increase awareness of severe sepsis/septic shock and improve overall EGDT adherence
Tufan et al.	2015	The knowledge of the physicians about sepsis bundles is suboptimal: a multicenter survey	Detect the knowledge of the physicians who are involved in sepsis management in daily work  n=223 providers	Multicentre questionnaire survey to providers from infectious disease, internal diseases, emergency medicine, and anesthesia	Knowledge of sepsis bundles, by physicians in charge of sepsis patients routinely, was suboptimal. Most were unaware of SSC bundles and SSC. Training is suggested.
Wang et al.	2013	Impact of sepsis bundle strategy on outcomes of patients suffering from severe sepsis and septic shock in China	Compare mortality rate between two groups of patients -before and after implementation of SSC sepsis performance improvement bundles in the ED  n=195	Prospective study with septic patients admitted to the ED between June 2008 and December 2009. A survey was completed by physicians to identify reasons for failure to comply with indicators.	Frequently reports reasons for non-compliance were: -did not think it (bundle) was needed -unsure of reason  Significant drop in mortality after implementing SSC bundles in the ED

					Barriers are knowledge, attitude, and behavioral barriers
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## Appendix D

## The Iowa Model of Evidence-Based Practice to Promote Quality Care



## Appendix E

## Disclosure Statement

I am a DNP student enrolled at The Ohio State University working to understand perceived barriers to sepsis bundle order set use in the ED by surveying ED providers. I am asking for your participation in my school project evidenced based practice project entitled Sepsis Bundle Use in the Emergency Department.

The purpose of the project is to evaluate perceived barriers and possible lack of knowledge surrounding the use of the sepsis bundle order set within the ED setting. Focus group results will be compared to best practice recommendations and evidence-based literature themes. The results will be shared with you following completion of the DNP project. This project will hopefully provide insight into why there is so little utilization of the sepsis order set in the ED, and what could be done to encourage use.

The focus group is based primarily on seven open-ended questions with follow up questions when warranted. The questions will ask about barriers to, experience with, and knowledge surrounding the sepsis bundle order set and sepsis treatment guidelines. The focus group will last approximately 30-60 minutes and will be led by one facilitator, the DNP student.

During this session I will be tape recording. The tape recording will be transcribed. Upon transcription, the recording will be destroyed. The transcription will be stored on the password protected computer of Joyce Zurmehly (College of Nursing Project Advisor). Your name will not appear anywhere on the transcription and there will be no link between your name and your attendance at this focus group.

You do not have to answer any questions that you do not want to answer, and you can quit at any time before the end of the focus group allotted time. There may be no direct benefit to you by participating in the project. The results and themes from the focus group will remain anonymous.

Information about you will be kept confidential to the extent permitted or required by law. After data collection is completed, all participant contact information obtained will be destroyed. If there are any professional presentations or publications about this study or group responses, your name, practice name, e-mail address, or postal address will not be included.

By participating in the focus group, you acknowledge that you have heard this information and agree to participate in this project.

During this focus group I encourage you to freely interact with each other as well as the focus group leader. This may include making comments to agree or disagree with your colleagues. This is a discussion and there are no right or wrong answers. I am seeking your professional opinions and viewpoints.

You will not be provided with any specific incentives today for your participation.

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. Your decision will not affect your employment status.

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By verbally agreeing to participate in this study, you do not give up any personal legal rights you may have as a participant in this study.

This is a qualitative study and did not require IRB approval.

I have now completed reading to you the consent form. Please let me know if you would like to proceed with participating in this study. If you agree, then I will move forward with the focus group.

Thank you

## Appendix F

## Initial e-mail prior to focus group meeting

OSU East ED Providers,

On Thursday, March 8, 2018, a focus group meeting will be held before the regularly scheduled faculty meeting that will help me complete my DNP project, as well as help the department. My project is a quality improvement project surrounding use of sepsis order sets in the ED.

The focus group will be held from 7:45-8:45 AM (before faculty meeting). The focus group should take anywhere from 30-60 minutes, and you are free to leave at any time.

Please see the attached informed consent letter with more information.

Thank you for your participation in advance!

Sincerely,

Christine Thiel, CNP  
DNP candidate

## Appendix G

## Demographic Survey

**Demographic Survey for Focus Groups**

**\*\*\*Do Not Write Your Name On This Survey\*\*\***  
**{All questions are optional}**

**1. Indicate years of practice in the ED:**

- 1) Less than 1
- 2) 1-5
- 3) 6-10
- 4) 11-15
- 5) 16 or more

**2. Indicate what type of provider you are:**

- 1) Attending physician
- 2) Nurse Practitioner
- 3) Physician Assistant

**3. How many shifts per month do you usually work at your clinical site of employment? (Regularly scheduled, without overtime needs)**

- 1) 18-20 shifts
- 2) 14-17 shifts
- 3) 10-13 shifts
- 4) 6-9 shifts
- 5) < 5 shifts



**4. What is your age?**

- 1) < 25 years
- 2) 26-30 years
- 3) 31-35 years
- 4) 36-40 years
- 5) 41-45 years
- 6) 46-50 years
- 7) 51-55 years
- 8) 56-60 years
- 9) 61-65 years
- 10) > 65 years

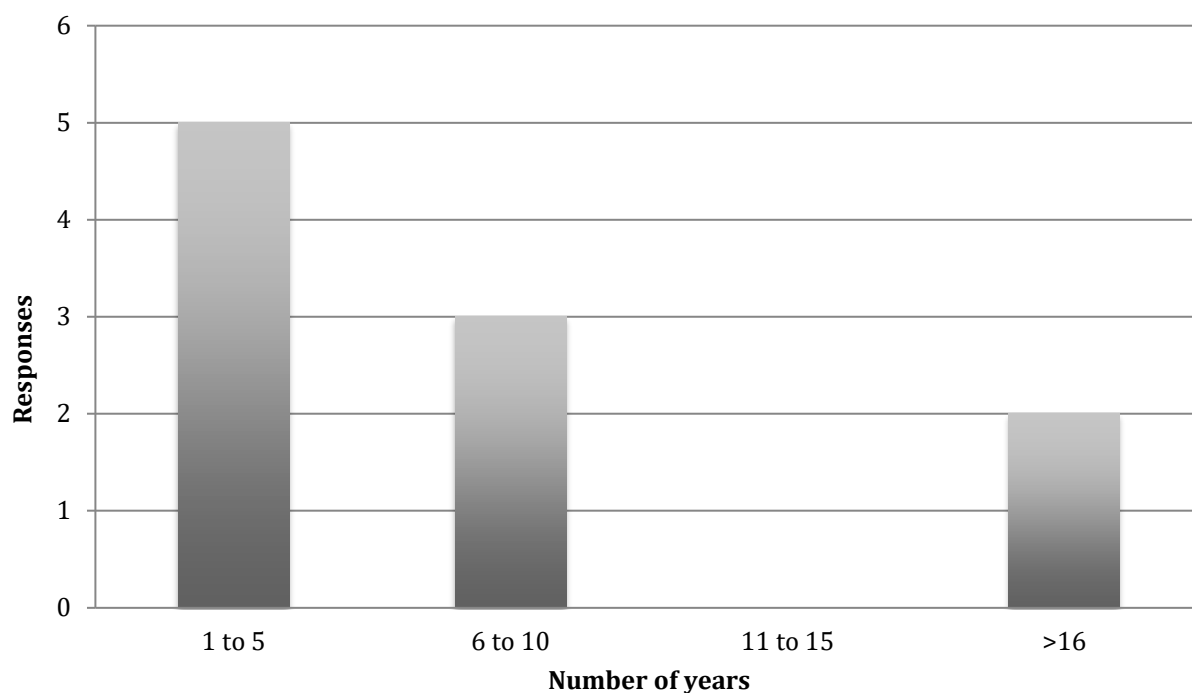
**5. What is your gender?**

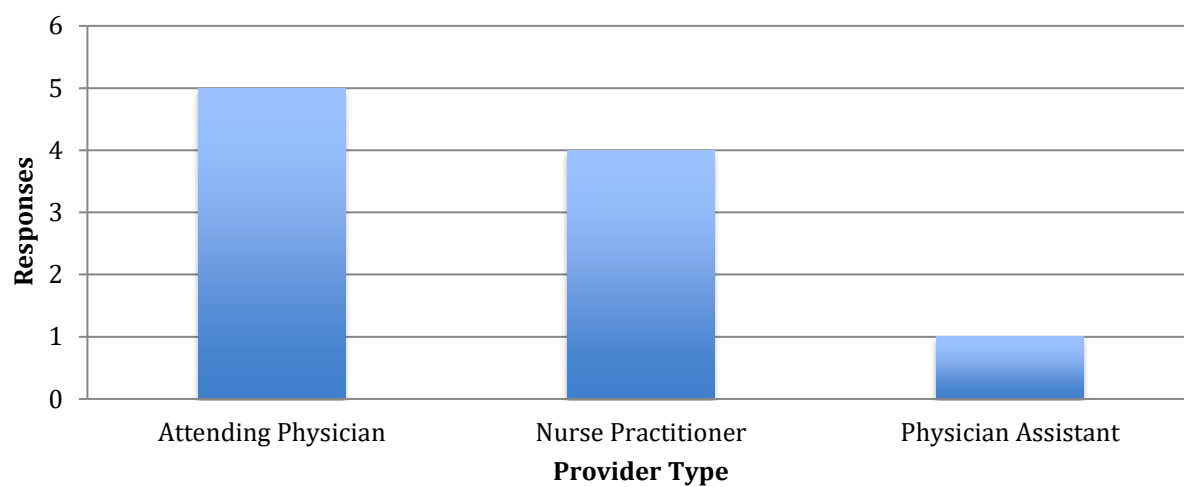
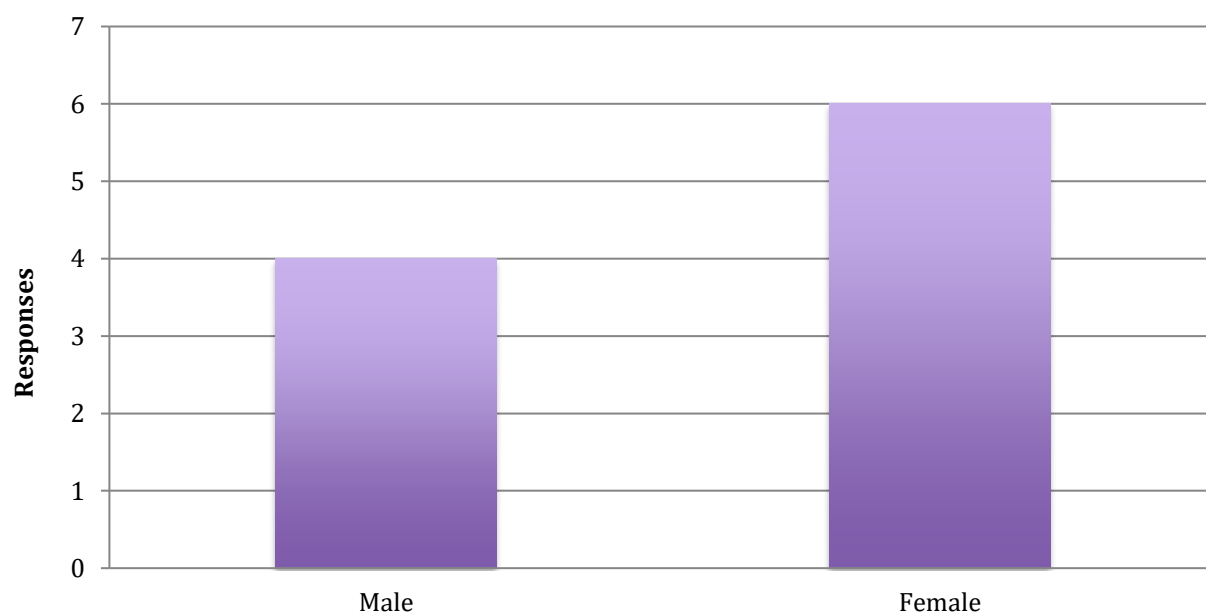
- 1) Male
- 2) Female

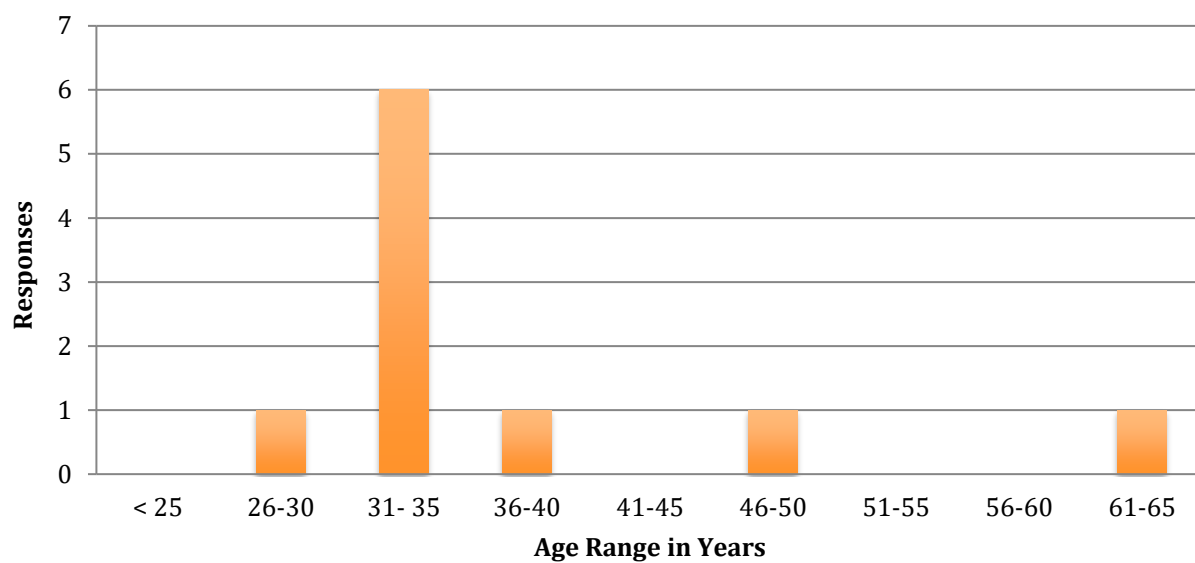
**6. Please indicate the number of years experience working in the ED?**

- 1) 0-5
- 2) 5-10
- 3) 10-15
- 4) over 15

## Appendix H

**Figure 1.1. Years of Practice in ED****Figure 1.2. Shifts per Month Worked in ED**

**Figure 1.3. ED Provider Type****Figure 1.4. Gender**

**Figure 1.5. Age of Participants**

## Appendix I

## Letter of support from ED Director



The Department of Emergency Medicine  
760 Prior Hall  
376 West 10<sup>th</sup> Avenue  
Columbus, OH 43210

February 6, 2017

To Whom It May Concern:

This letter is in response to support of Christine Thiel. I fully support Christine as she moves forward with her DNP project from both the administrative and clinical sides of the Emergency Department.

Please feel free to contact me, should you require additional information.

Sincerely,

Michael Dick, MD  
Medical Director  
OSU East Emergency Department  
181 Taylor Avenue  
Columbus, OH 43203  
614.257.3414